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Sanidastra yokotonensis, n. gen. and n. sp. of Freshwater Sponge from Japan

By

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(Communicated by Yoshihiko KUROSAWA)

This paper deals with the study of a specimen of freshwater sponge collected by Yoko WATANABE from the Yokotone-gawa Canal, Nakajima, Azuma-mura, Ibaragi Prefecture, Japan, on November, 12, 1980. The sponge displays characteristics of such magnitude and peculiarity to impose the description of a new species and the erection of a new genus to contain it. The holotype is deposited in the National Science Museum, Tokyo (Registered number of NSMT-Po 4). Fragments of the holotype and slide material are deposited in the Department of Biology, Ochanomizu University, Tokyo, under number 80–122 and in the Museu de Ciencias Naturais, Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, Brazil, under number 1097 of the Porifera Catalog.

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Sanidastra n. gen.

Gender: Feminine.

Type species: *Sanidastra yokotonensis* n. sp.

Megascleres: Smooth or microspined oxea or tornotes derived from subtylostyles. Rare subtylostyles and styles present.

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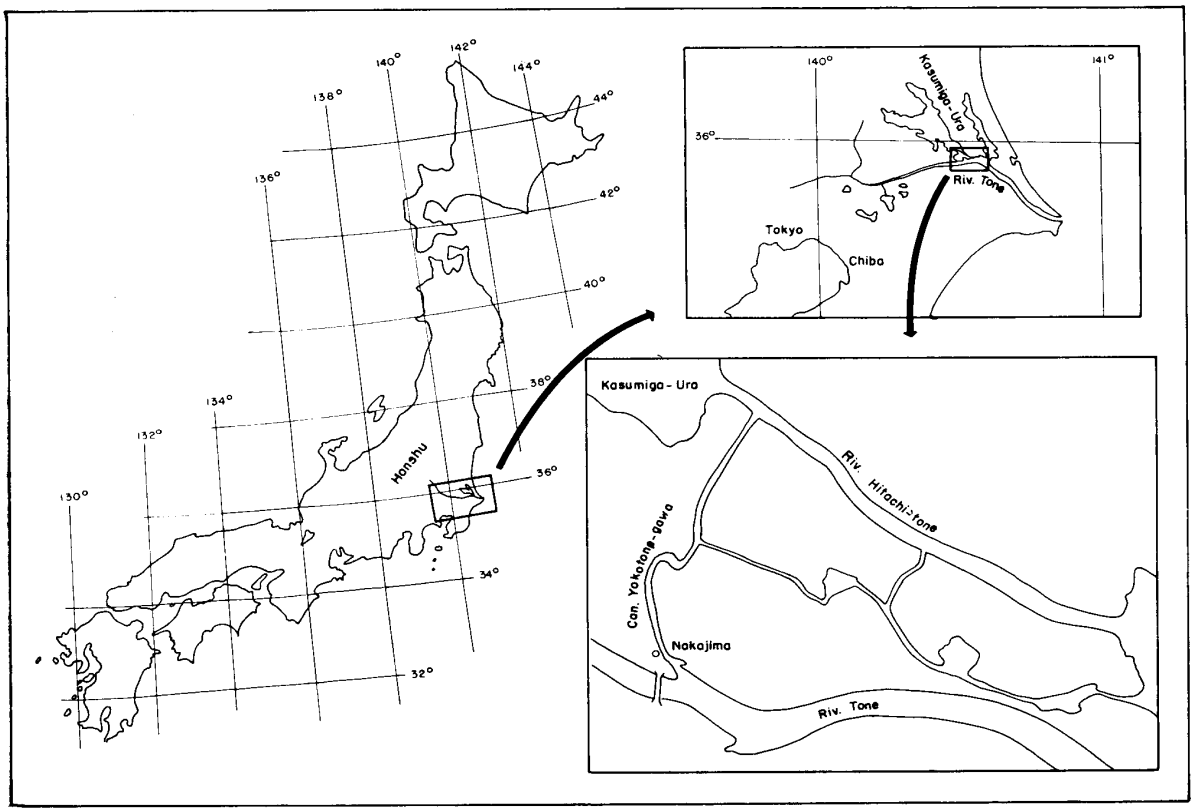

Fig. 1. Map showing the situation of the Yokotone-gawa Canal, collecting locality of *Sanidastra yokotonensis* n. sp., in the basins of the Kasumiga-ura Lake and Tone River, Japan.

Microscleres: Absent.

Gemmoscleres: Variations of the spinulated sanidaster (WIEDENMAYER, 1977), taking to the predominance of an apparently strongylate or oxeote sclere, microspined except at its extremities.

Gemmules: Abundant, spherical to hemispherical, found from the base to the surface of the sponge. Full grown gemmules with a thick pneumatic coat which contains the radially, sparsely embedded gemmoscleres. Inner and outer gemmular walls well formed. Foramen single, elevated.

Sponge: Greenish yellow, with a basal, thick, almost circular crust from which arise flabelliform expansions. Surface slightly hispid, oscules conspicuous, not elevated, each oscule close to a cribiporal area. Pinacoderm very conspicuous and charged with megascleres.

Skeleton: Consisting of a confuse, compact or open dispositions of the megascleres in the basal crust, whereas in the flabelliform expansions, long axial fibers may be formed which project beyond the pinacoderm with brushlike terminations, rendering the surface distinctly hispid at such areas.

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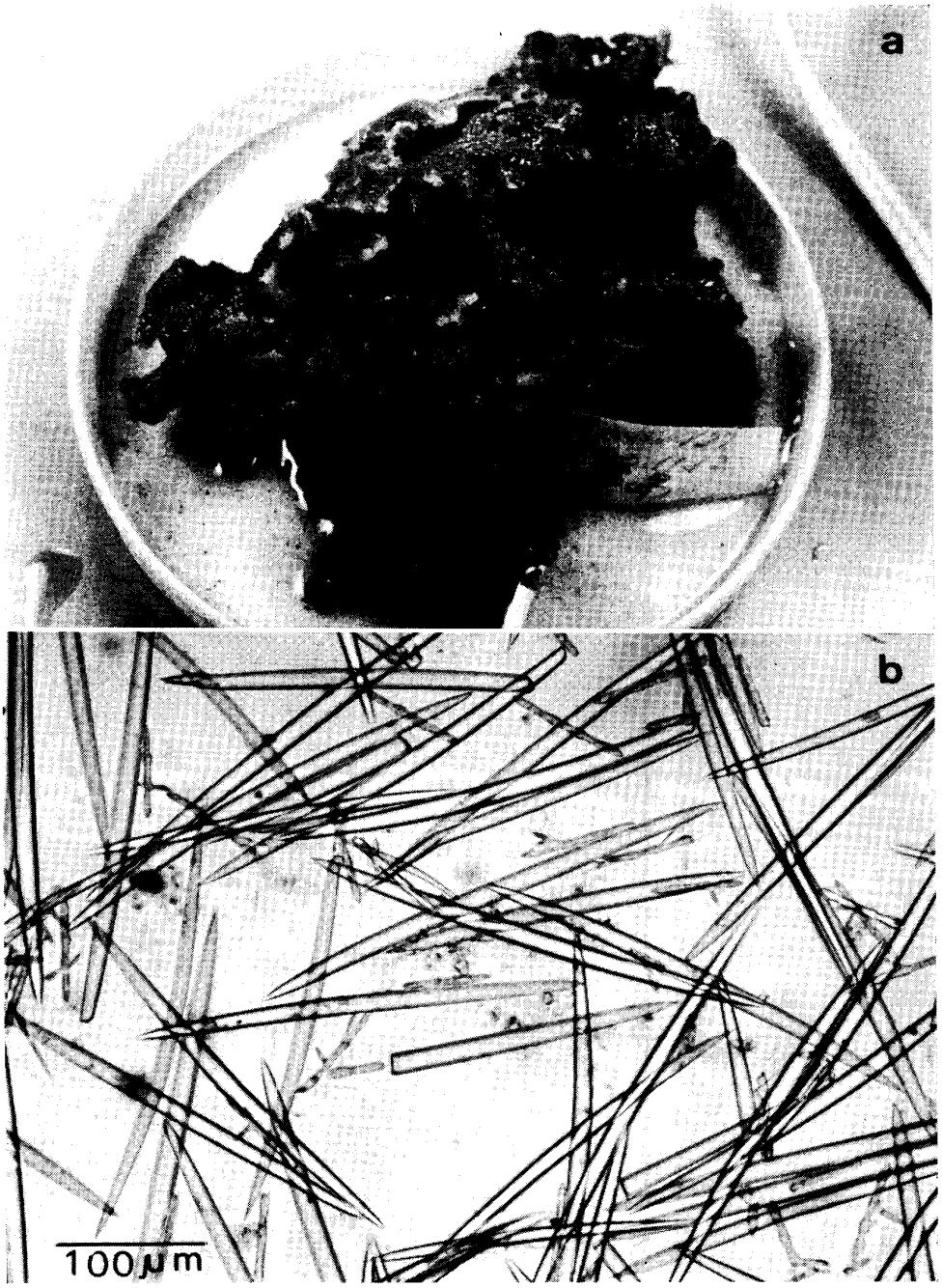

Fig. 2. *Sanidastra yokotonensis* n. sp. —— a. Holotype specimen, photographed alive. —— b. Megascleres and gemmoscleres.

Sanidastra yokotonensis n. sp.

(Figs. 1–6)

Type locality: Yokotone-gawa Canal, Japan.

Description: Live sponge greenish yellow, delicate, compressible, with almost

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circular outline, 5 cm. long and 4, 5 cm. wide, forming flabelate expansions which arise from a basal, quite thick crust. Surface slightly hispid. Oscules conspicuous, not very numerous, large, with a random distribution at the basal crust as well as

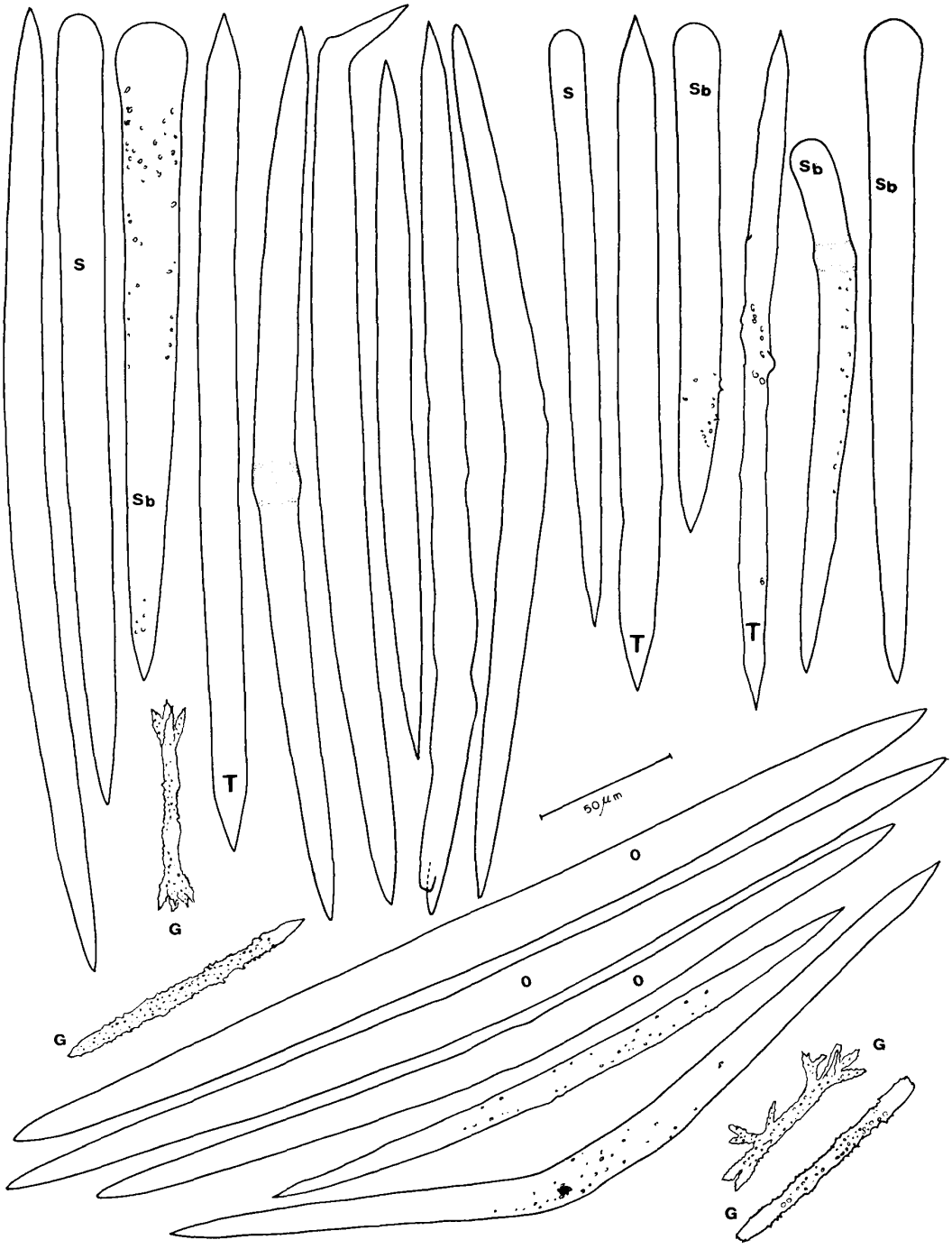

Fig. 3. Spicular components of *Sanidastra yokotonensis* n. sp. G=gemmoscleres, S=styles, Sb=subtylostyles, T=tornotes, O=oxea.

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at the expansions, not elevated. It is not difficult to detect at the side of each larger oscule a cribiporal area. Pinacoderm very conspicuous and charged with randomly embedded megascleres of all the sorts here described.

Dry sponge drab yellow, fragile, the skeleton consisting, at the basal crust, of a

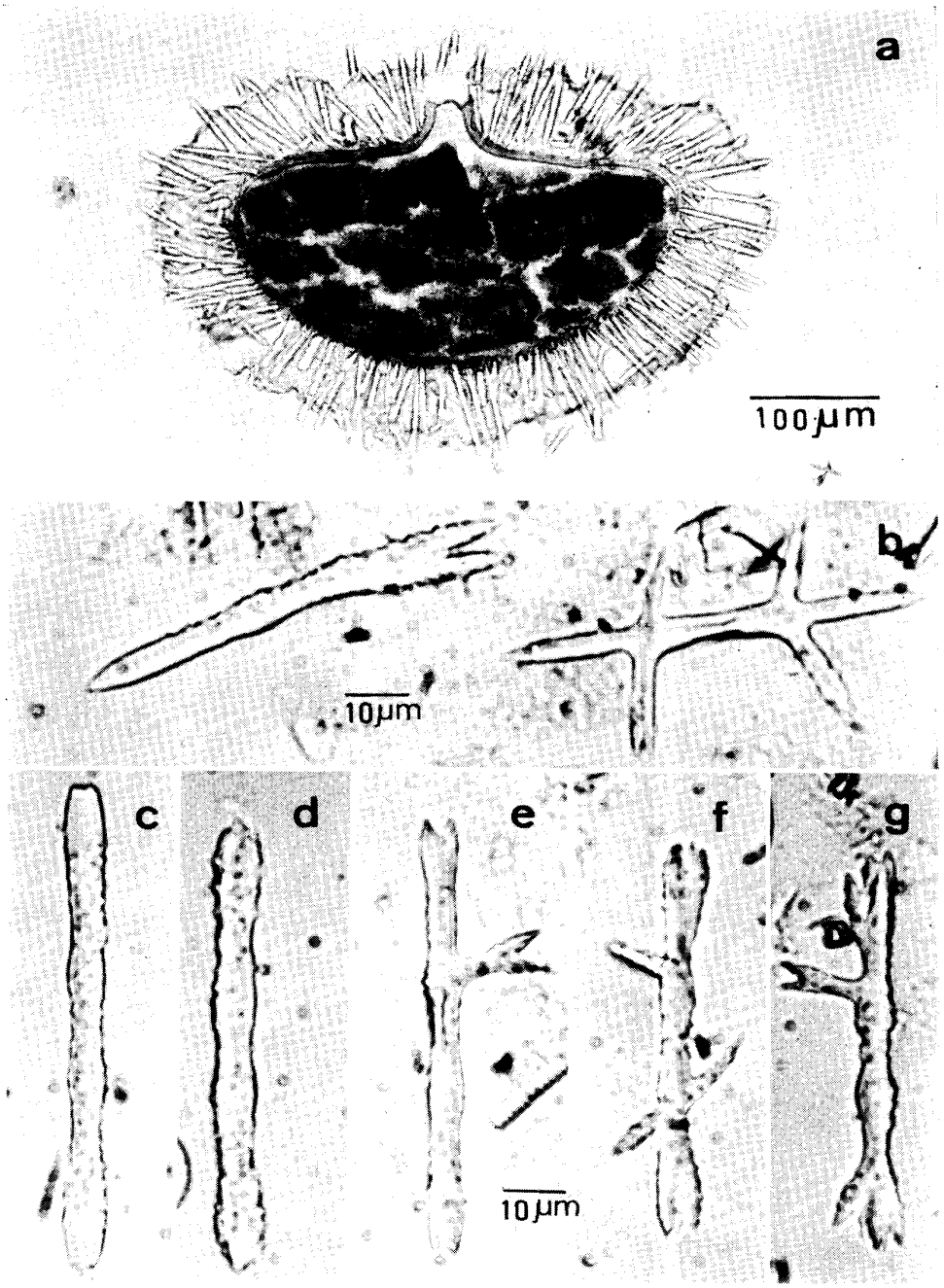

Fig. 4. *Sanidastra yokotonensis* n. sp. —— a. Longitudinal section of the gemmule (Bouin fixative, Toluidine-blue staining, 10 micrometer sectioning) —— b. Two of the variations exhibited by the gemmoscleres. —— c, d. Most common gemmoscleres. —— e–g. Gemmoscleres which clearly indicate origin from the spinulated sanidaster.

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confuse, compact or open disposition of the megascleres, whereas in the flabelliform expansions long axial fibers may be formed which project beyond the pinacoderm with brushlike terminations, rendering the surface distinctly hispid at such areas.

Megascleres: An amazing series of microspined megascleres which run from

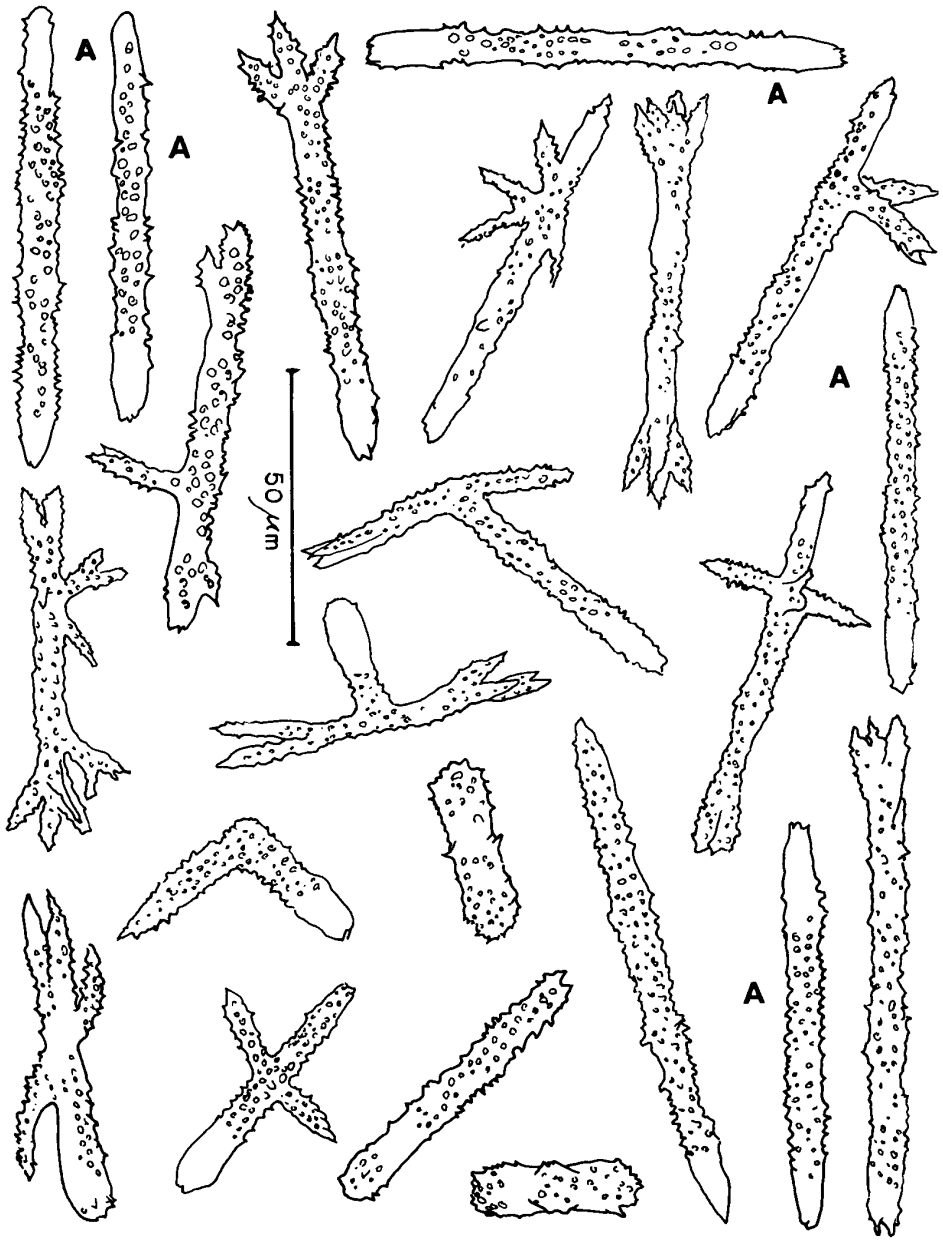

Fig. 5. Variations of the spinulated sanidasters in the gemmular armature of *Sanidastra yokotonensis* n. sp. A=Most common gemmoscleres.

Fig. 6. Scanning electron micrographs of *Sanidastra yokotonensis* n. sp. —— a. Longitudinal section of the gemmule. —— b. Pneumatic layer of the gemmule and gemmoscleres. —— c. Megasclere showing microspines on the surface. —— d, e. Most common gemmoscleres. —— f–m. Variations of the gemmoscleres.

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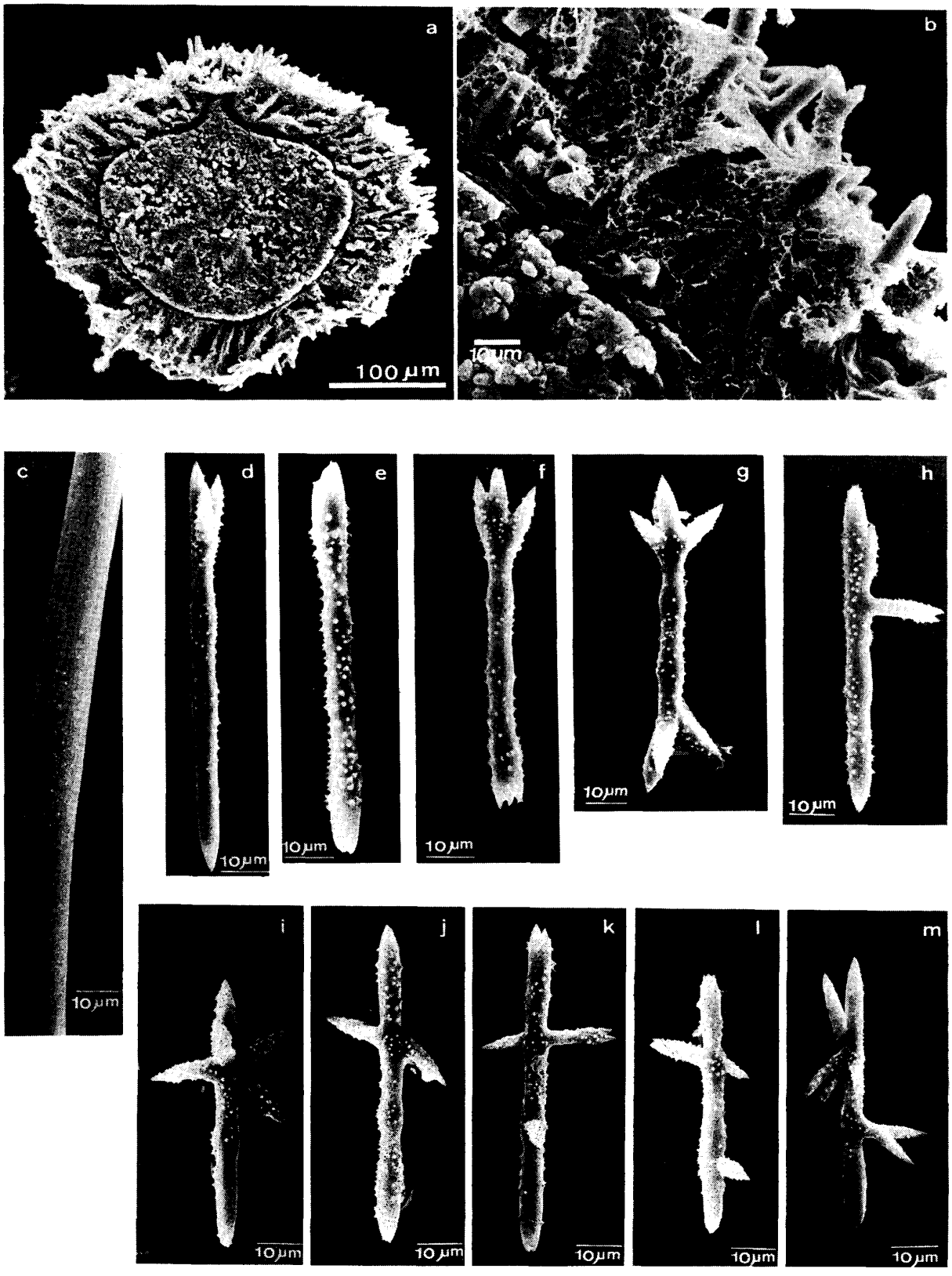

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Table 1. Measures of spicules of *Sanidastra yokotonensis* n. sp., given in micrometers.

	Maximum length	Maximum width
Megascleres		
Subtylostyles & Styles	267	19
Tornotes	300	17
Oxea	381	19
Gemmoscleres	95	8

rare subtylostyles and styles to tornotes and the prevailing oxea, but showing all transitional steps from one type to the other, from straight to curved and from very young to adult scleres. (Only at the scanning microscope was it possible to evidence a microgranulation on all the megascleres).

Microscleres: Absent.

Gemmoscleres: An array of variations of the spinulated form of the sanidaster. The most common tendency, however, in the specimen studied, was the production of an apparent strongylate sclere with crenulated extremities and covering of microspines which leave free only the extremities of the sclere.

Gemmules: Abundant, single or groupped in patches which may be found very close to the surface of the sponge. Small and spherical or large and hemispherical. Diameter of gemmules reaching from 368 to 514 micrometers. Pneumatic coat well developped in the large gemmules and consisting of spherical air spaces. Gemmoscleres radially, almost sparsely embedded in this coat in a single layer, with one extremity reaching or protruding the well defined outer gemmular membrane. Foramen elevated, reaching halfway of the pneumatic coat.

Distribution: Hitherto known only from the Yokotone-gawa Canal, Japan.

Habitat: The sponge was collected on November 12, 1980 from the bank of the Yokotone-gawa Canal in Nakajima, Azuma-mura, Ibaragi Prefecture, Japan. At the collecting date the water of the canal was 13.0°C at 10: 00 a.m. and had a pH value of 7.0.

The seven kilometers long canal connects the west outolet of the Kasumiga-ura Lake to the Tone River (Fig. 1). The canal is blocked off by a gate at the Kasumiga-ura extremity and by another gate at the Tone River extremity, what usually prevents the stablishment of a current. The water is less than 2 meters deep and this level is maintained the year through, the canal being not dried out even in the winter season. The canal banks have a protecting concrete covering.

In spite of the fact that the Kasumiga-ura basin, including the Yokotone-gawa Canal, have now freshwater, there are historical records, yet to be confirmed, that the lake was previously an inlet of the sea penetrating the land from the Pacific Ocean.

The canal waters support a quite conspicuous community of freshwater sponges which are found on the banks, stalks of weeds, wood posts or on the under side of the wood fishing boats.

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Remarks: A comparison of the material presently studied with the species and genera of freshwater sponges know up to now, PENNEY, 1960; PENNEY & RACEK, 1968, SASAKI, 1973; VOLKMER-RIBEIRO, 1981, evinced the necessity of the description of the new species and the erection of a new monotipic genus to contain it. On the other hand, the occurrence of sanidasters as gemmoscleres and of vestigial subtylostyles as megascleres, clearly indicate the branching into freshwater of an hadromerid stock of sponges, more precisely, a latrunculid stock.

The present evidence is the second one which comes to confirm the hypothesis put forth by VOLKMER-RIBEIRO & De ROSA-BARBOSA, 1979, when those authors discussed the characteristics of *Sterrastrolepis brasiliensis*, described by them in 1978 and pointed out that hadromerid sponges standed out as a group particularly fitted for the invasion of freshwater habitat. That fitness would involve first, the potentiality of producing gemmules exhibited by sponges with a cortical armature of particular microscleres and second, the potentiality of transfering that armature to the gemmular coat in the freshwater habitat.

VOLKMER-RIBEIRO & De ROSA-BARBOSA, 1979 also listed evidences of a passive mechanism of invasion of the freshwater habitat by marine sponges, pointing out that endemic genera of freshwater sponges presently occur in lakes left behind by past marine invasions, rather than in stuaries or rivers. The occurrence of *Sanidastra yokotonensis*, n. sp. very close to the outlet of the Kasumiga-ura Lake, seems to come to reinforce that proposition.

Literature Cited

PENNEY, J. T., 1960. Distribution and bibliography (1892–1957) of the freshwater sponges. *Univ. South Carolina Publ.* ser. 3, **13** (1): 1–97.

——— & A. A. RACEK, 1968. Comprehensive revision of a worldwide collection of freshwater sponges (Porifera: Spongillidae). *U.S. Nat. Mus. Bull.*, **272**: 1–184.

SASAKI, N., 1973. Some freshwater sponges collected from the middle part of Japan. *J. Shimonoseki Univ. Fish.*, **21**: 31–47.

VOLKMER-RIBEIRO, C., 1981. Porifera, *In*: S. H. HURLBERT, G. RODRIGUES & N. D. SANTOS, eds. Aquatic Biota of Tropical South America, Part 2: Anarthropoda. San Diego State University, San Diego, California, XI+298: 86–95.

——— & R. De ROSA-BARBOSA, 1979. Neotropical freshwater sponges of the Family Potamolepidae BRIEN, 1967. *In*: LEVI, C. & N. BOURY-ESNAULT eds. 1979. Biologie des Spongiaires-Sponge Biology, Paris, Centre National de la Recherche Scientifique, 1–533, il. (Colloques Internationaux du Centre National de la Recherche Scientifigue, **291**: 503–511.)

WIEDENMAYER, R., 1977. Shallow-water sponges of the western Bahamas. Birkhäuser, Basel (Experientia Supplementa **28**: 1–287, 43 plates.)

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